SOME SPECTRAL PROPERTIES OF A FOURTH ORDER DIFFERENTIAL OPERATOR WITH SPECTRAL PARAMETER IN BOUNDARY CONDITION

Abstract

In the paper we consider the spectral problem

$$y^{(4)}(x) - (q(x)\, y'(x))' = \lambda y(x), \qquad x \in (0, l),$$

$$y(0) = y'(0) = y''(l) = 0,$$

$$Ty(l) = (a\lambda + b)\, y(l),$$

where λ is a spectral parameter, q is an absolutely continuous positive function on interval $[0,\ l]$, $Ty \equiv y''' - qy'$, a , b are real constants with $a > 0$.

The general characteristic of eigenvalues disposition on a real axis (complex plane) is given, the structure of roots subspaces is studied, the oscillation properties of eigenfunctions are investigated, and the asymptotic formulae for eigenvalues and eigenfunctions of this problem are obtained.